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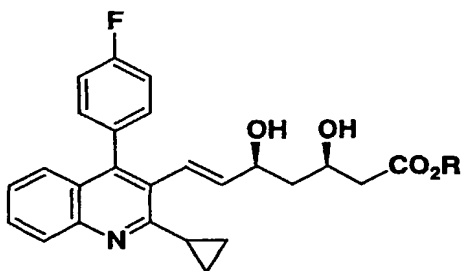
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ning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR PRODUCING A 3,5-DIHYDROXY-6-HEPTENOATE



(1)

(57) Abstract: A method for producing an alkyl
(3R,5S)-7-[2-cyclopropyl-4-(4-fluorophenyl)quino-
lin-3-yl]-3,5-dihydroxy-6-heptenoate of the formula (1)
(wherein R is a C₁₋₄ alkyl group), which is an intermediate
for a cholesterol-reducing agent (a HMG-CoA reductase
inhibitor), etc. A solution containing a compound of
the formula (1) is subjected to liquid chromatography
treatment using silica gel as the packing material, to
separate its epimers contained therein.

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A. CLASSIFICATION OF SUBJECT MATTER
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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

CHEM ABS Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	S. NAGAMATSU: "CHIRAL SEPARATION OF A PHARMACEUTICAL INTERMEDIATE" JOURNAL OF CHROMATOGRAPHY A, vol. 832, no. 1+2, 5 January 1999 (1999-01-05), pages 55-65, XP002269744 GB page 56 -page 63	1-7
A	EP 0 747 341 A (NISSAN) 11 December 1996 (1996-12-11) cited in the application claims; examples 7,8	1
A	EP 0 520 406 A (NISSAN) 30 December 1992 (1992-12-30) cited in the application claims	1,7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 747341	A	11-12-1996	AT 217859 T 15-06-2002
			AU 691582 B2 21-05-1998
			AU 1823195 A 11-09-1995
			CA 2183071 A1 31-08-1995
			DE 69526784 D1 27-06-2002
			DE 69526784 T2 05-09-2002
			EP 0747341 A1 11-12-1996
			US 5939552 A 17-08-1999
			CN 1141028 A ,B 22-01-1997
			HU 74486 A2 28-01-1997
			WO 9523125 A1 31-08-1995
EP 520406	A	30-12-1992	JP 5148237 A 15-06-1993
			AT 170513 T 15-09-1998
			CA 2072162 A1 25-12-1992
			DE 69226822 D1 08-10-1998
			DE 69226822 T2 11-02-1999
			DK 520406 T3 14-12-1998
			EP 0520406 A1 30-12-1992
			EP 0742209 A2 13-11-1996
			ES 2120973 T3 16-11-1998
			KR 208867 B1 15-07-1999
			US 5473075 A 05-12-1995
			US 5514804 A 07-05-1996
			US 5284953 A 08-02-1994